

LITERATURE REVIEWS

Otto, C. 1999, Effects of Prey and Turion Size on the Growth and Turion Production of the Carnivorous Bladderwort, *Utricularia vulgaris* L. Arch. Hydrobiol. 145(4): 469-478.

Harms, S. 1999, Prey Selection in Three Species of the Carnivorous Aquatic Plant *Utricularia* (Bladderwort). Arch. Hydrobiol. 146(4): 449-470.

Mendez, M., Gwynn Jones, D. & Manetas, Y. 1999, Enhanced UV-B Radiation Under Field Conditions Increases Anthocyanin and Reduces the Risk of Photoinhibition but does not Affect Growth in the Carnivorous Plant *Pinguicula vulgaris*. New Phytologist 144: 275-282.

Stoyanova, D. 1999, Ultrastructural Responses of Leaf Mesophyll and Trap Wall Cells of *Utricularia vulgaris* to Cadmium. Biologia Plantarum 42(3): 395-400.

The preceding four recent scientific publications on *Utricularia* and *Pinguicula* physiology are too specialized to be discussed in detail here. The titles are quite self-explanatory, and investigators with a serious interest should consult the original papers. (JS)

Owen, T.P., Lennon, K.A., Santo, M.D. & Anderson, A.N. 1999, Pathways for Nutrient Transport in the Pitchers of the Carnivorous Plant *Nepenthes alata*. Annals of Botany 84: 459-466.

Two different tracers have been used to study transport phenomena *Nepenthes alata* pitchers. 1. The heavy metal salt lanthanum nitrate releases lanthanum ions in an aqueous solution, which are not taken up by cells. The electron-dense metal ions can be seen as a dark stain in transmission electron microscopy, and it marks extracellular, apoplastic space. Application of this tracer in pitcher fluid did only stain the cell walls (but not the cytoplasm!) of the outer cell layers of digestive glands. It did not enter the leaf further because an endodermoid cell layer (cf. Carniv. Pl. Newslett. 26: 34-38, 1997) serves as a barrier to further apoplastic transport. If applied to vascular bundles of the petiole, lanthanum ions were detected in the pitcher and leaf vasculature and in the cell walls of adjacent cells (but again not in the cytoplasm of these cells). No tracer entered the pitcher fluid this way. 2. The fluorescent compound 6-(5)-carboxyfluorescein is taken up actively by cells and is therefore a marker for intracellular, symplastic space. If applied to pitcher fluid, this marker was observed to enter glandular cells and to be transported via a symplastic route to vascular tissue beneath the glands and from there further down the leaf. If fed to petiolar vascular bundles, the fluorescent tracer was able to enter leaves and pitchers up to the mesodermoid layer at the base of digestive glands, but it penetrated the glands and reached the pitcher fluid only in juvenile, unopened pitchers, while it was retained by the mesodermoid layer in ripe, opened pitchers. "This suggest that the endodermal barrier develops more closely to the time of pitcher opening. A more precise study of the development of this endodermal barrier is underway", according to the authors. (JS)

Gervais, C. & Gauthier, R. 1999, Étude cytotoxonomique des espèces et des hybrides naturels du genre *Drosera* (Droseraceae) au Québec. "Cytotoxonomic Study of the Species and Natural Hybrids of the Genus *Drosera* (Droseraceae) in Quebec" (in French, with English abstract). Acta Bot. Gallica 146(4): 387-401.

The literature values for chromosome counts of the *Drosera* taxa growing naturally in Quebec are confirmed. The natural, diploid ($2n=20$), sterile hybrid *D. linearis* \times *D. rotundifolia* is described as *D. \times woodii*. However, if *D. anglica* is regarded as amphidiploid, fertile offspring of such a hybrid (which is done by most taxonomists), the name *D. \times woodii* is a later synonym of *D. anglica* (or *D. \times anglica*, cf. ICBN Art. H.3.4.: "For purposes of homonymy and synonyms the multiplication sign and the prefix "notho-" are disregarded"). The name *D. \times linglica* (for the hybrid *D. anglica* \times *D. linearis*), originally proposed for an artificial hybrid created in cultivation but not properly described as a taxon, is validated by a Latin protologue and the citation of a type specimen. (JS)

Lobreau-Callen, D., Jérémie, J. & Suarez-Cervera, M. 1999, Morphologie et ultrastructure du pollen dans le genre *Utricularia* L. (Lentibulariaceae). "Morphology and Ultrastructure of Pollen in the Genus *Utricularia* L. (Lentibulariaceae)" (in French, with English abstract). Canadian Journal of Botany 77: 744-767.

At least for me (who did originally not read Taylor's monograph thoroughly enough; the essential data were already mentioned but obviously likewise overlooked by him!), this precious piece of literature has been an eye-opener. The essential message is that pollen morphology coincides with other data (not mentioned in this paper), and evolutionary courses become apparent. *Utricularia* can be divided into two natural groups, viz. the species with bracteoles (only *U. heterosepala* apparently never has them but it nevertheless is an unambiguous member of this group), which have pollen with usually 3 to 7 ectoapertures (this includes sects. *Polypompholyx* and *Tridentaria*, which only deviate from sect. *Pleiochasia* in additional calyx lobes, making even subgeneric distinction rather doubtful), and those which persistently lack free bracteoles (the strange fusion product in sect. *Lecticula* possibly marks a "missing" link), which have pollen with 8 or more ectoapertures. As a deviation from the rule, sects. *Psyllosperma* and *Foliosa*, with bracteoles, exhibit the latter pollen type. This is particularly noteworthy because in all representatives of sect. *Foliosa* and in some of sect. *Psyllosperma* the bracteoles are partially fused with their supporting bract, perhaps representing a transitional condition (cf. also sect. *Lecticula*!). Thus, not only plesiomorphic and apomorphic character states but also transitional pathways and possible intermediate conditions become obvious. A more detailed discussion of carnivorous plant evolution (by yours truly) for this journal is in preparation. (JS)

Blanca, G., Ruíz-Rejón, M. & Zamora, R. 1999, Taxonomic Revision of the Genus *Pinguicula* L. in the Iberian Peninsula. Folia Geobotanica 34: 337-361.

An interesting review of available data from recent collections and literature. Apparently (if the plants were identified correctly), *P. vulgaris* co-occurs with what the authors identify with *P. mundi* in the Tajo gorge (Cuenca, Spain). This requires confirmation, because the plants known from there resemble neither taxon but rather *P. longifolia* subsp. *dertosensis* (called *P. dertosensis* in the present paper), which is also geographically the closest taxon. Noteworthy is the occurrence of *P. grandiflora* in southern Spain (not hitherto recorded from here), which could explain (in terms of a "bridgehead" position) herbarium specimens that were allegedly collected in Morocco (part of the confused mixed material with *P. vulgaris*, on which the ambiguous name *P. fontiqueriana* was based; cf. Ann. Bot. Fennici 33:31, 1996). A still more recent update for *P. lusitanica* is in: Sánchez-Rodríguez, J.A. 2000, *Pinguicula lusitanica* L. (Lentibulariaceae), novedad para el Sistema Central. Anales Jardín Botánico de Madrid 58(1): 196-197. (JS)